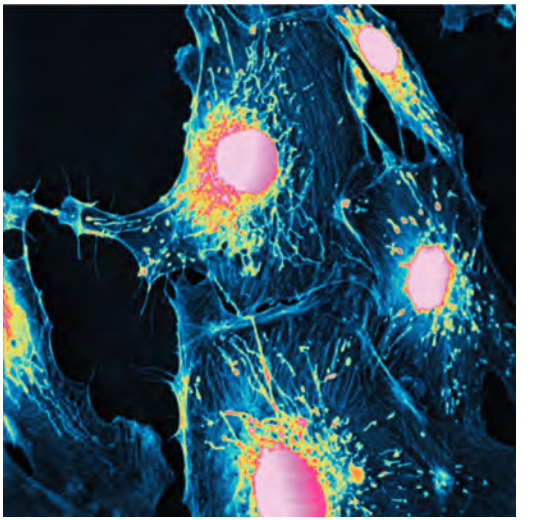
Oxidative Stress ASSAY KITS



ARBOR ASSAYS™

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ORDERING

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E-mail: Send E-mail orders to Orders@ArborAssays.com. See our E-Mail Order Form at: www.arborassays.com/ordering

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Mail: Arbor Assays LLC, Sales Order Entry
1514 Eisenhower Place, Ann Arbor, MI 48108-3284, USA

DetectX®

Catalase Colorimetric & Fluorescent Activity Kits

Catalog Nos: Colorimetric: K033-H1 Fluorescent: K033-F1

FEATURES

- Use — Measure Catalase Activity in any Sample
- Convenient — Everything needed to measure Catalase activity in 45 minutes
- Sensitive — Measure as little as 0.052 U/mL
- Samples/Kit — 89 in Duplicate
- Stability — All Liquid Reagents Stable at 4°C
- Format — 2 by 96-well Plates per Kit
- Species — Species Independent
- Rapid — Results in 45 minutes
- Readout — Colorimetric: 560 nm Fluorescent: 585 nm

MULTI SPECIES

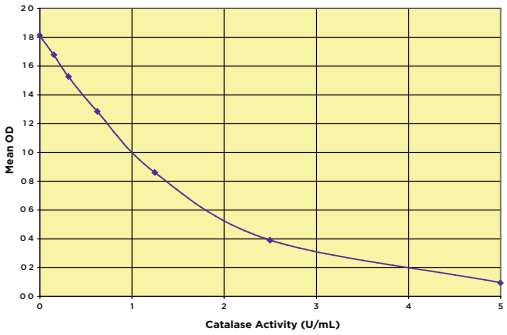
SCIENTIFIC RELEVANCE

Hydrogen peroxide, H_2O_2 is one of the most frequently occurring reactive oxygen species. It is formed either in the environment or as a by-product of aerobic metabolism, superoxide formation and dismutation, or as a product of oxidase activity. Both excessive hydrogen peroxide and its decomposition product hydroxyl radical, formed in a Fenton-type reaction, are harmful for most cell components. Its rapid removal is essential for all aerobically living prokaryotic and eukaryotic cells. One of the most efficient ways of removing peroxide is through the enzyme catalase, which is encoded by a single gene, and is highly conserved among species. Mammals, including humans and mice, express catalase in all tissues, and a high concentration of catalase can be found in the liver, kidneys and erythrocytes. The expression is regulated at transcription, post-transcription and post-translation levels. High catalase activity is detected in peroxisomes.

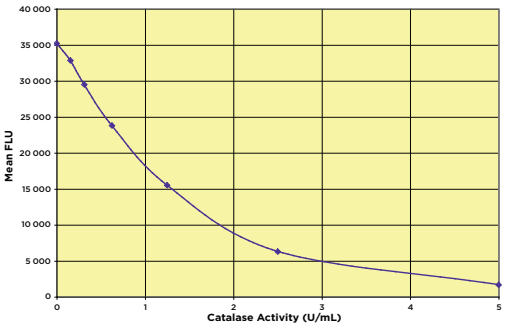
MOST SENSITIVE

TYPICAL DATA

Colorimetric



Fluorescent



DetectX®

Formaldehyde Fluorescent Detection Kit

Catalog No: K001-F1 (2 Plate) **Covered by US Patents**

FEATURES

- Use — Measure Formaldehyde in Urine, Water or TCM
- Convenient — No extraction, No Chemical Derivatization, 30 minute assay
- Species — All Species and Samples
- Samples/Kit — 88 in Duplicate

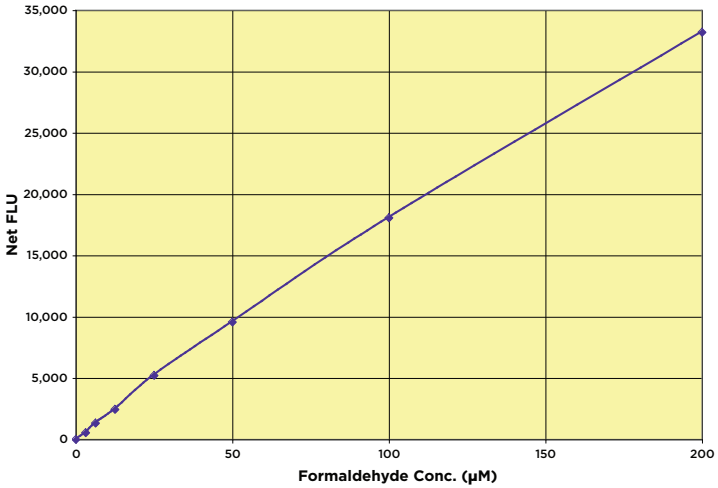
MULTI SPECIES

SCIENTIFIC RELEVANCE

Formaldehyde (methanal), $H_2C=O$, is a colorless, flammable, strong-smelling gas. It is an important industrial chemical used to manufacture building materials and to produce many household products. In the US approximately 3 x 10^9 Kg are produced annually. Formaldehyde is commonly used as an industrial fungicide, germicide, and disinfectant, and as a preservative in mortuaries and medical laboratories. Materials containing formaldehyde can release formaldehyde gas or vapor into the air. Formaldehyde can also be released by burning wood, kerosene, natural gas, or cigarettes, from automobile emissions, and from natural processes. Occupational exposure to formaldehyde by inhalation is mainly from three types of sources: thermal or chemical decomposition of formaldehyde-based resins, formaldehyde emission from aqueous solutions (for example, embalming fluids), and the production of formaldehyde resulting from combustion. Formaldehyde can be toxic, allergenic, and carcinogenic. Because formaldehyde resins are used in many construction materials, it is one of the more common indoor air pollutants.

TYPICAL DATA

MOST SENSITIVE



FRAP™ Colorimetric Detection Kit

Patent Protected **Catalog No: K043-H1 (2 Plate)**

FEATURES

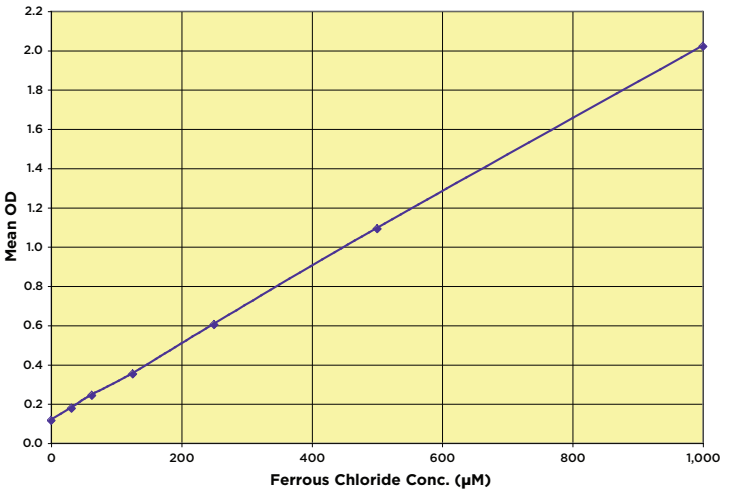
- Use — Ferric Reducing Anti-Oxidant Potential (FRAP) ability of samples
- Samples — Serum, Plasma, Urine, Food, Cosmetics, Additives
- Samples/Kit — 88 in Duplicate
- Stability — All Liquid Reagents Stable at 4°C

MULTI SPECIES

SCIENTIFIC RELEVANCE

Potentially harmful reactive oxygen species (ROS) are produced as a consequence of normal aerobic metabolism. "Free Radicals" (FR) are usually removed or inactivated *in vivo* by a team of antioxidants. They are chemically stable atoms and molecules, which have one or more free electron/electrons. Almost all biomolecules, but mainly biomembranes, proteins and nucleic acids, may be attacked by reactive free radicals. Free radicals are responsible for many pathological processes, or they can be generated as the result of the pathological stage and cause important secondary damage to biological systems and cells. Connections between free radicals and some serious diseases, including Parkinson´s and Alzheimer´s disease, atherosclerosis, heart attacks, and chronic fatigue syndrome, have been demonstrated. However, short-term oxidative stress, the unbalance between the formation and scavenging of the reactive oxygen species, may be important in the prevention of aging due to triggering of the process known as mitohormesis. On the average, 65 – 70% of the population is excessively impacted by oxidative stress caused by FRs.

TYPICAL DATA



DetectX®

Glutathione (GSH) Colorimetric Detection Kit

Catalog No: K006-H1 (4 Plate)

FEATURES

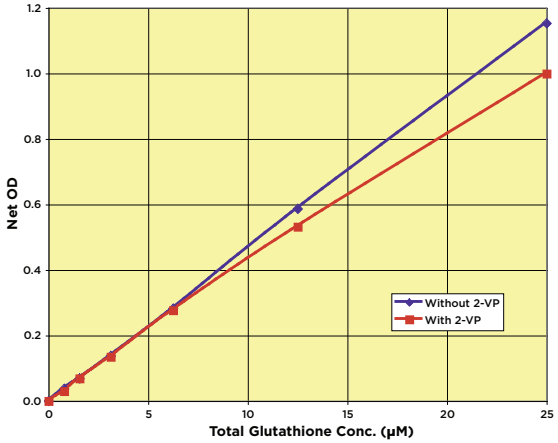
Use	Measure GSH/GSSG in Cells, RBC's, Serum, Plasma, Urine, and Tissues
Sensitive	< 32 pmol/sample
Economical	4 by 96-well Plate per Kit
Species	Species Independent
Samples/Kit	89 in Duplicate
Stability	Reagents Stable at 4°C
Readout	Colorimetric, 405 nm

MULTI SPECIES

SCIENTIFIC RELEVANCE

Glutathione (L-γ-glutamyl-L-cysteinylglycine; GSH) is the highest concentration non-protein thiol in mammalian cells and is present in concentrations of 0.5 – 10 mM. GSH is a tripeptide that contains an unusual peptide linkage between the amine group of cysteine and the carboxyl group of the glutamate side-chain. It is an antioxidant, preventing damage to important cellular components caused by reactive oxygen species such as free radicals and peroxides. Glutathione reduces disulfide bonds formed within cytoplasmic proteins to cysteines by serving as an electron donor. In the process, glutathione is converted to its oxidized form, glutathione disulfide (GSSG). Glutathione is found mostly in its reduced form, since the enzyme that reverts it from its oxidized form, glutathione reductase, is constitutive and inducible upon oxidative stress. The ratio of reduced glutathione to oxidized glutathione within cells is often used as a measure of cellular toxicity.

TYPICAL DATA



Glutathione (GSH) Fluorescent Detection Kits

96 Well: Catalog No: K006-F1 (1 Plate) K006-F5 (5 Plate)
384 Well: Catalog No: K006-F1D (2 Plate)

FEATURES

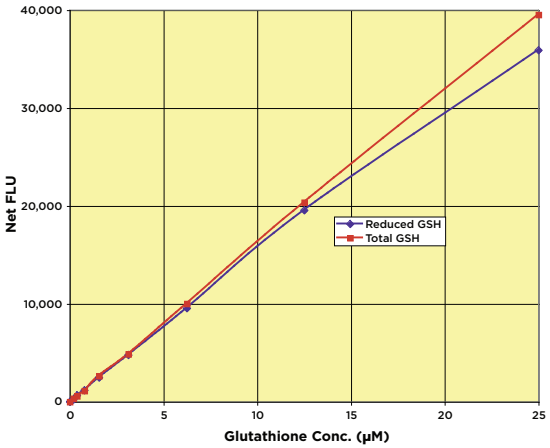
Use	Measure GSH/GSSG in Cells, RBC's, Serum, Plasma, Urine, and Tissues
Convenient	Measures free and total GSH separately in same sample
Species	Species Independent
Sensitive	< 2.5 pmol/sample
Samples/Kit	96-well kits: 39 or 231 in Duplicate
	384-well kit: 183 in Duplicate
Stability	Reagents Stable at 4°C
Readout	Fluorescent, 510 nm

MULTI SPECIES

SCIENTIFIC RELEVANCE

Glutathione (L-γ-glutamyl-L-cysteinylglycine; GSH) is the highest concentration non-protein thiol in mammalian cells and is present in concentrations of 0.5 – 10 mM. GSH is a tripeptide that contains an unusual peptide linkage between the amine group of cysteine and the carboxyl group of the glutamate side-chain. It is an antioxidant, preventing damage to important cellular components caused by reactive oxygen species such as free radicals and peroxides. Glutathione reduces disulfide bonds formed within cytoplasmic proteins to cysteines by serving as an electron donor. In the process, glutathione is converted to its oxidized form, glutathione disulfide (GSSG). Glutathione is found mostly in its reduced form, since the enzyme that reverts it from its oxidized form, glutathione reductase, is constitutive and inducible upon oxidative stress. The ratio of reduced glutathione to oxidized glutathione within cells is often used as a measure of cellular toxicity.

TYPICAL DATA



MOST SENSITIVE

Oxidative Stress Antibodies

FEATURES

- Uses WB, IP, IF, EIA, ELISA

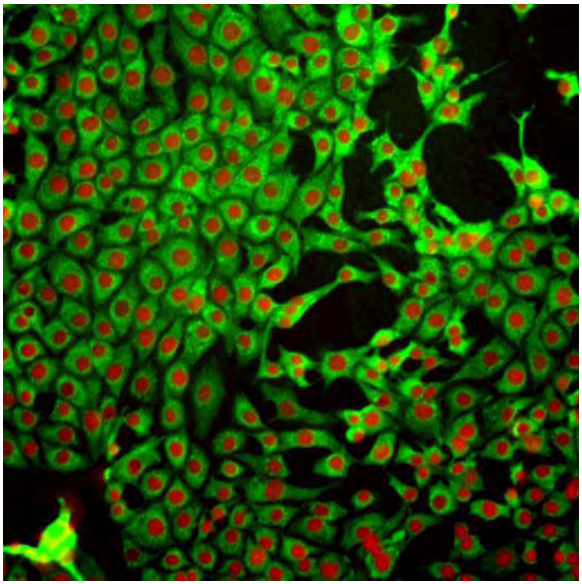
DESCRIPTION	HOST	USES	SIZE	CATALOG NO.
L-Cysteine	Mouse	WB, IF, IHC, IP, ELISA	50 µg	A002-50UG
Glutathione	Mouse	WB, IF, IP, ELISA	50 µg	A001-50UG
Glutathione-DyLight® 488	Mouse	WB, IF, FACS	50 µg	A001F-50UG
Glutathione-DyLight® 550	Mouse	WB, IF, FACS	50 µg	A001T-50UG

WB=Western blotting: IP=Immunoprecipitation: IF=Immunofluorescence: IHC=Immunohistochemistry:
EIA=Enzyme immunoassay; ELISA=Enzyme-Linked ImmunoSorbant Assay:
DyLight® is a registered trademark of Thermo Fisher Corp

TYPICAL DATA

Immunofluorescence

HeLa Cells stained with MxGSH monoclonal A001-50UG and goat anti-mouse IgG-FITC



DetectX®

Glutathione Reductase Fluorescent Activity Kit

Catalog No: K009-F1 (1 Plate)

FEATURES

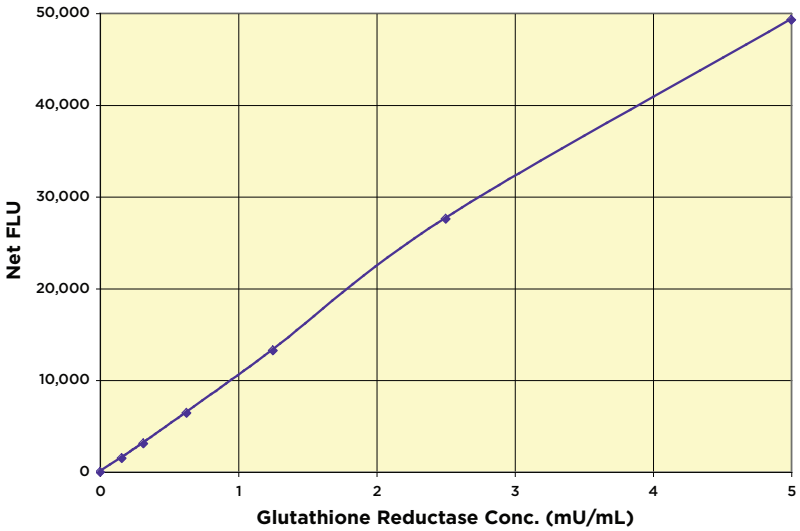
- Use — Measure GR activity in RBCs, serum, plasma, and cells
- Convenient — Rate or 20 minute end point Fluorescent Kit
- Sensitive — 9 µU/mL, World's Most Sensitive
- Species — Species Independent
- Samples/Kit — 41 in Duplicate
- Stability — Reagents Stable at 4°C
- Readout — Fluorescent, 510 nm

MULTI SPECIES

SCIENTIFIC RELEVANCE

Glutathione reductase (GR) plays an indirect but essential role in the prevention of oxidative damage within the cell by helping to maintain appropriate levels of intracellular glutathione (GSH). GSH, in conjunction with the enzyme glutathione peroxidase (GP), is the acting reductant responsible for minimizing harmful hydrogen peroxide cellular levels. The regeneration of GSH is catalyzed by GR. GR is an ubiquitous 100-120 kDa dimeric flavoprotein that catalyzes the reduction of oxidized glutathione (GSSG) to reduced glutathione, using ß-nicotinamide dinucleotide phosphate (NADPH) as the hydrogen donor. NADPH has been suggested to also act as an indirectly operating antioxidant, given its role in the re-reduction of GSSG to GSH and thus maintaining the antioxidative power of glutathione.

TYPICAL DATA



MOST SENSITIVE

DetectX®

Glutathione S-Transferase Fluorescent Activity Kit

Catalog No: K008-F1 (1 Plate)

FEATURES

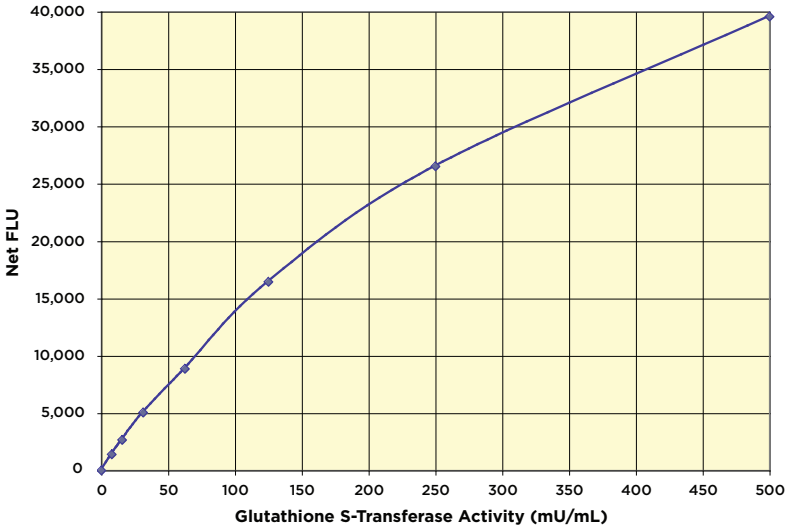
Use	Fluorescent detection of GST Activity
Sample	Serum, Plasma, and Cell Lysates
Samples/Kit	40 in Duplicate
Convenient	30 Minute End Point or Kinetic Assay
Sensitive	< 100 µU of GST Activity
Stability	Reagents Stable at 4°C
Readout	Fluorescent, 460 nm

MULTI SPECIES

SCIENTIFIC RELEVANCE

The Glutathione S-Transferase (GST) family of isozymes function to detoxify and neutralize a wide variety of electrophilic molecules by mediating their conjugation with reduced glutathione. Human GSTs are encoded by five gene families, expressing in almost all tissues as four cytosolic and one microsomal forms. Given its pivotal role in ameliorating oxidative stress/damage, GST activity has been repeatedly investigated as a biomarker for arthritis, asthma, COPD, and multiple forms of cancer, as well as an environmental marker. Examination of GST isoforms and activity in human cancers, tumors and tumor cell lines has revealed the predominance of the acidic pi class. Furthermore, this activity is thought to substantially contribute to the innate or acquired resistance of specific neoplasms to anticancer therapy.

TYPICAL DATA



Hemoglobin Colorimetric Detection Kit

Catalog No: K013-H1 (2 Plate)

FEATURES

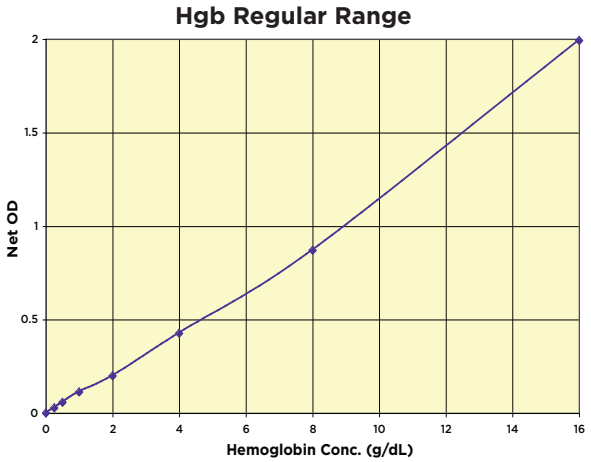
Sample	Blood, RBC's, Serum, Plasma
Rapid	30 Minutes
Sensitive	20 µg/mL
Samples/Kit	88 in Duplicate
Stable	All Liquid, 4°C Stable Reagents
Readout	Colorimetric, 560-580 nm

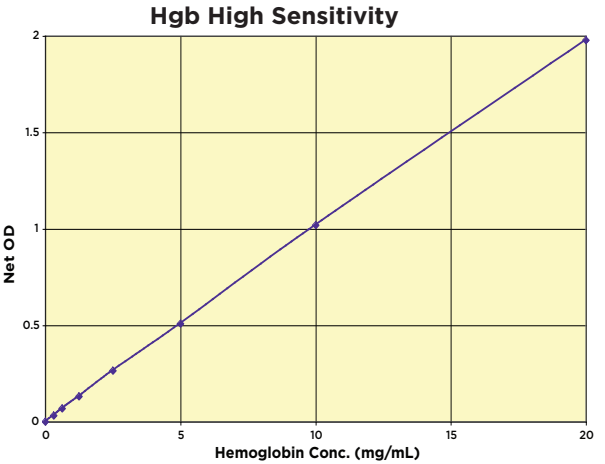
SCIENTIFIC RELEVANCE

Hemoglobin (Hgb) is an erythrocyte protein complex comprised of two sets of identical pairs of subunits, each of which bind an iron-prophyrin group commonly called heme. Generally containing two alpha or alpha-like globulin chains, the remaining subunits may be beta, gamma, delta or epsilon, or in the case of infants, fetal hemoglobin that is replaced during the first year of life. Heme binds and releases oxygen or carbon dioxide in response to slight changes in local gas tension.

Free oxygen or carbon dioxide bound by one heme group facilitates subsequent binding by the other heme groups in a given hemoglobin molecule. Subtle changes in pH also regulate hemoglobin affinity for free gases, resulting in a high level of hemostatic control. Hemoglobin values are associated with a variety of conditions ranging from anemias (low Hgb), erythrocytosis (high Hgb), thalassemias (aberrant chain synthesis), and sickling disorders (abnormal complex shape).

TYPICAL DATA





DetectX®

Hydrogen Peroxide Colorimetric & Fluorescent Detection Kits

Catalog No: Colorimetric: K034-H1 (2 Plate) Fluorescent K034-F1 (2 Plate)

FEATURES

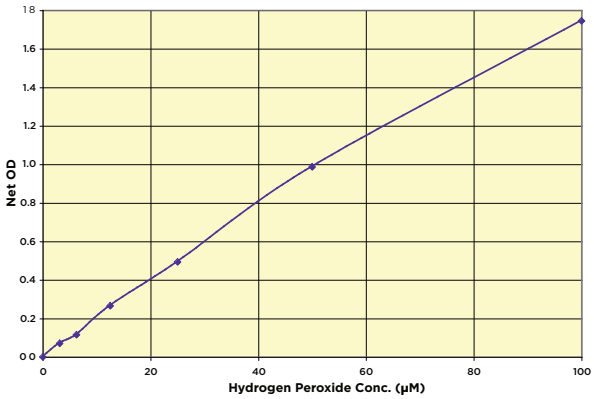
▶ Sample	Urine, Buffer, TCM			
▶ Rapid	15 Minutes			
▶ Sensitive	< 2 pmole (65 pg) H_2O_2			
▶ Samples/Kit	Colorimetric:	89 in Duplicate	Fluorescent:	88 in Duplicate
▶ Readout	Colorimetric:	560 nm	Fluorescent:	585 nm

SCIENTIFIC RELEVANCE

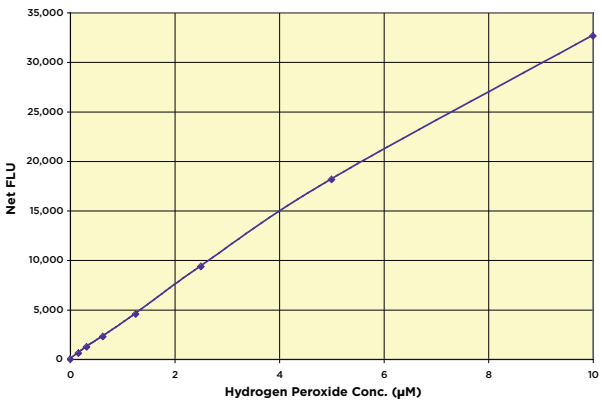
In biological systems, incomplete reduction of O_2 during respiration produces superoxide anion ($O_2^{-}\cdot$), which is spontaneously or enzymatically dismutated by superoxide dismutase to H_2O_2. Many cells produce low levels of $O_2^{-}\cdot$ and H_2O_2 in response to a variety of extracellular stimuli, such as cytokines (TGF-ß1, TNF-α, and various interleukins), peptide growth factors (PDGF; EGF, VEGF, bFGF, and insulin), the agonists of heterotrimeric G protein–coupled receptors (GPCR) such as angiotensin II, thrombin, lysophosphatidic acid, sphingosine 1-phosphate, histamine, and bradykinin, and by shear stress. The addition of exogenous H_2O_2, or the intracellular production in response to receptor stimulation, affects the function of various proteins including protein kinases, protein phosphatases, transcription factors, phospholipases, ion channels, and G proteins. In 1894, Fenton described the oxidation of tartaric acid by Fe^{2+} and H_2O_2. H_2O_2 and O_2 may participate in the production of singlet oxygen and peroxynitrite and the generation of these species may be concurrent with reactions involving iron, and under some circumstances they might be important contributors to H_2O_2 toxicity.

TYPICAL DATA

Colorimetric Standard Curve



Fluorescent Standard Curve



DetectX®

N-CAL™ KIT

Nitric Oxide Colorimetric Detection Kit

Catalog No: K023-H1 (2 Plate)

FEATURES

▶ Use	Measure Nitrite & Nitrate in Water, Serum, Plasma, Urine, Saliva, and TCM
▶ Accurate	Calibrated to NIST Standard Reference material #3185
▶ Sensitive	Highest Optical Density of Any Kit
▶ Rapid	5 Minute Nitrite – 30 Minute Total NO
▶ Samples/Kit	88 in Duplicate
▶ Stability	Non-Toxic, Stable Reagents at 4°C
▶ Readout	Colorimetric: 540-570 nm

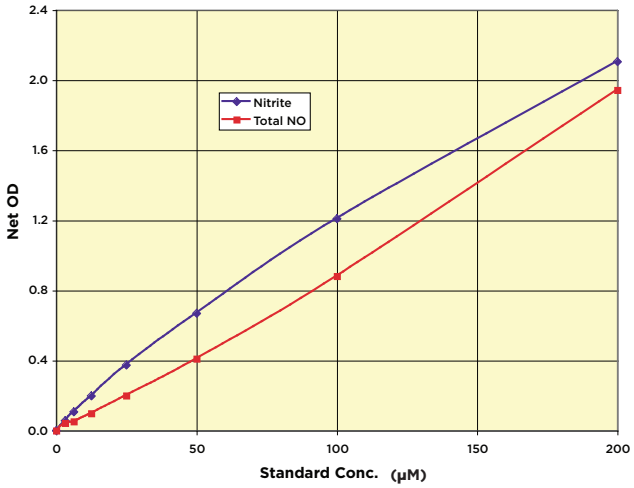
MULTI SPECIES

SCIENTIFIC RELEVANCE

Nitric oxide (NO) is a diffusible, transient, reactive molecule that has physiological effects in the pM-µM range. Acting through guanylate cyclase activation, NO is an important regulator of the cardiovascular, nervous, and immunological systems. NO is bio-available by two routes. It can be endogenously generated by constitutive or induced NOS enzymes, or it can be ingested as nitrates or nitrites for conversion into NO. The reactive nature of nitric oxide allows it to act as a cytotoxic factor when released during an immune response by macrophages. The reactivity also allows NO to be easily converted to a toxic radical that can produce nitrosylation damage to cells and DNA. Nitrosylation can be a regulated post-translational modification in cell signaling. The dynamics of the regulatory/damage facets of NO are major forces in mitochondrial signaling and dysfunction. NO is linked not only to coronary heart disease, endothelial dysfunctions, erectile dysfunction, and neurological disorders, but also diabetes, chronic periodontitis, autism and cancer.

TYPICAL DATA

MOST SENSITIVE



DetectX®

Superoxide Dismutase Colorimetric Activity Kit

Catalog No: K028-H1 (2 Plate)

FEATURES

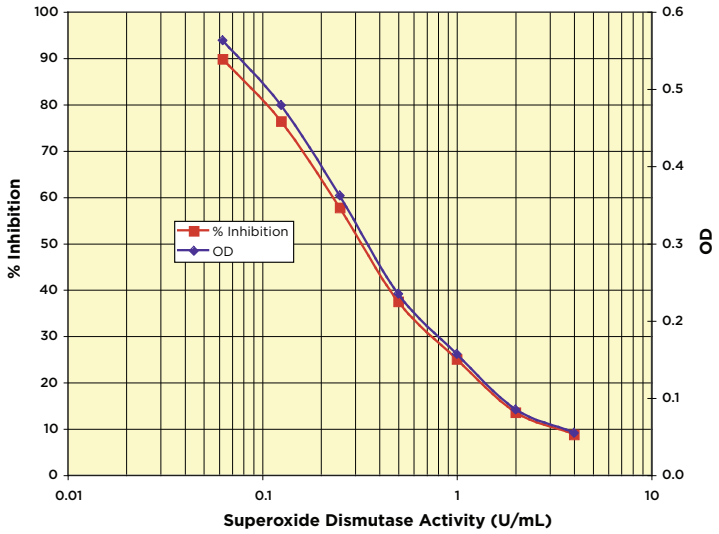
- Use — Measure SOD Activity
- Sample — Serum, Urine, and Buffer samples
- Species — Human and other mammalian species
- Samples/Kit — 89 in Duplicate

MULTI SPECIES

SCIENTIFIC RELEVANCE

Short-lived and highly reactive oxygen species (ROS) such as $O_2^{\cdot-}$ (superoxide), $^{\cdot}OH$ (hydroxyl radical), and H_2O_2 (hydrogen peroxide) are continuously generated *in vivo.* The cellular levels of ROS are controlled by antioxidant enzymes and small molecule antioxidants. The major antioxidant enzymes, superoxide dismutases (SODs), including copper-zinc superoxide dismutase (Cu/ZnSOD), manganese superoxide dismutase (MnSOD), and extracellular superoxide dismutase (EC-SOD). All play a critical roles in scavenging O_2.. Decreased SOD activity results in elevated level of superoxide which in turn leads to decreased NO and increased peroxynitrite concentrations. The major intracellular SOD is a 32-kD copper and zinc containing homodimer (Cu/Zn SOD). The mitochondrial SOD (MnSOD) is a manganese-containing 93-kD homotetramer that is synthesized in the cytoplasm and translocated to the inner matrix of mitochondria. EC-SOD is the primary extracellular SOD enzyme and is highly expressed in many organs. Increased SOD activity levels are seen in Downs Syndrome, while decreased activity is seen in diabetes, Alzheimer's disease, rheumatoid arthritis, Parkinson's disease, uremic anemia, atherosclerosis, some cancers, and thyroid dysfunction.

TYPICAL DATA



DetectX®

Thiol Fluorescent Detection Kit

Catalog No: K005-F1 (1 Plate)

FEATURES

Use	Measure Thiol content of Recombinant Proteins
Adaptable	Measure Protein SH in 6M GuHCl Buffers
Sensitive	< 0.5 pmol Thiol/well
Rapid	30 Minute Assay
Samples/Kit	39 in Duplicate
Stability	Non-Toxic, Reagents Stable at 4°C
Readout	Fluorescent, 510 nm

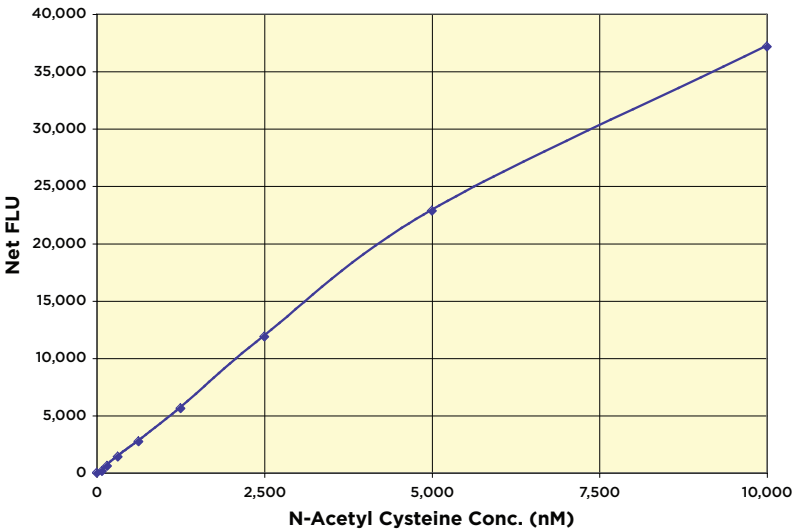
MULTI SPECIES

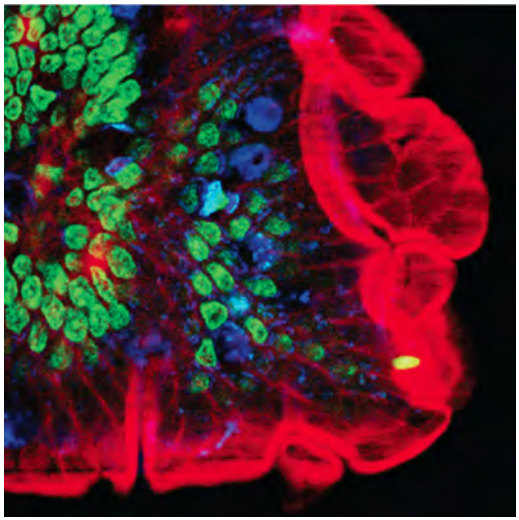
SCIENTIFIC RELEVANCE

Free thiols in biological systems have important roles. Oxidatively modified thiol groups of cysteine residues are known to modulate the activity of a growing number of proteins. One of the most pressing problems is to accurately determine the extent of modification of specific amino acids, such as cysteine residues, in a complex protein sample, especially in the presence of chaotropic agents such as guanidine hydrochloride. Typical methods such as using Ellman's reagent have limited sensitivity requiring large quantities of purified recombinant or native protein.

TYPICAL DATA

MOST SENSITIVE





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